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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/513.067 02/24/00 DE SIMMONE

C AB-928 US

EXAMINER

024251 MMC1/0509
SKJERVEN MORRILL MACPHERSON LLP
25 METRO DRIVE
SUITE 700
SAN JOSE CA 95110

ART UNIT PAPER NUMBER

2825
DATE MAILED:

05/09/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/513,067

Applicant(s)

DE SIMMONE ET AL.

Examiner

Chuong A Luu

Art Unit

2825

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claims ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some * c) ☒ None of:

1. ☒ Certified copies of the priority documents have been received. *[Please note: No ribboned copy has been received.] Mrs*
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892)
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 18) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other: _____.

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DETAILED ACTION

Priority

Acknowledgment is made of applicant's claim for foreign priority based on an application filed in 09513067 on 2/24/2000. It is noted, however, that applicant has not filed a certified copy of the foreign priority application as required by 35 U.S.C. 119(b). Please note: No ribboned copy has been received.

PRIOR ART REJECTIONS

Statutory Basis

Claim Rejections - 35 USC § 102

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The Rejections

Claims 1-3, 5-7, 9, and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Jeng et al.

Jeng disclose heat sink bonded to a die paddle having at least one aperture with

(1) A semiconductor package comprising: a semiconductor chip (58); a package body (50) formed of a hardened encapsulant material (78); metal leads (52), wherein each lead is electrically connected to the chip; a flat plate fully encapsulated within said package body (50), wherein the chip (58) is mounted on the plate and an encapsulated first portion of each of the leads overhangs a periphery of the plate (note columns 4 and 5 lines 63-67 and 1-11, respectively. Figure 4); **(2)** wherein the plate is comprised of copper and has a CuO or CU₂O film on all surfaces thereof (note column 5 lines 7-10); **(3)** wherein an electrically insulative, thermally conductive adhesive layer (70) is attached between the first portion of the leads and the plate, and said layer is covered by said encapsulant material (78) (note Figure 1); **(5)** wherein the plate is metal (64), and further comprising a plurality of electrically isolated, encapsulated members; wherein each said member extends from an edge of the package body toward said plate (64) and overhangs the periphery of the plate; wherein said metal plate is a connection with each said member (note Figure 4); **(6)** wherein each said member extends from a corner of said package body (note Figure 4); **(7)** wherein the metal plate (64) is connected to said members by an electrically insulative, thermally conductive adhesive layer (70) (note column 5 lines 29-31. Figure 4); **(9)** wherein the connection is a metal to metal connection between the plate and each said member (note column 5 lines 2-11. Figure 4); **(11)** wherein the encapsulant material is between said plate and the first portion of the leads (note Figure 4).

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jeng et al. in view of Joiner, Jr.

Jeng disclose the above outlined features except for wherein said adhesive layer is a double-sided tape. However, Joiner discloses drop-in heat sink package with window frame flag with (4) wherein said adhesive layer is a double-sided tape (note column 4 lines 61-62). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to combine the above teachings to manufacture a semiconductor device to exceed its performance.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jeng et al. in view of Tao et al.

Jeng disclose the above outlined features except for a protrusion from a surface of the plate. However, Tao disclose semiconductor package having a heat spreader capable of preventing being soldered and enhancing adhesion and electrical performance by (8) wherein each said connection is between the respective member and a protrusion from a surface of the plate (note column 2 lines 35-42). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to combine the teachings of Jeng and Tao to fabricate a semiconductor package.

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jeng et al.

Jeng disclose the above outlined features except for wherein the plate is formed of metal, and the metal plate has a thickness that is at least two times a thickness of said leads. However, as shown in Figure 4, it suggests the thickness of metal plate is at least two times a thickness of said leads. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to specific the thickness.

Claims 12-14, and 16-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Parthasarathi

Parthasarathi discloses a electronic package with improved thermal properties by **(12)** A leadframe comprising: a metal frame (16) including a central region within the frame; a plurality of metal leads (18) extending from a first end integral with the frame (16) to a second end adjacent to the central region; a flat plate supported in the central region, wherein a first portion of each said lead overhangs a peripheral edge of said plate; **(13)** wherein the plate is comprised of copper and has a CuO or CU₂O film on all surfaces thereof (note column 2 lines 17-21); **(14)** wherein an electrically insulative, thermally conductive adhesive layer (26) is attached between the first portion of the leads and the plate (note column 2 lines 27-29); **(16)** further comprising a plurality of electrically isolated members extending from said frame adjacent to said leads; wherein each said member overhangs the periphery of the plate and is in a connection with said plate (note column 2 lines 37-44); **(17)** wherein each said member extends from corner of said frame (note Figure 1); **(18)** wherein the metal plate is connected to said

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members by an electrically insulative, thermally conductive adhesive layer (note column 2 lines 27-29); **(19)** wherein each connection is a metal to metal connection between the plate and the respective member (note column 2 lines 53-59).

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Parthasarathi in view of Joiner, Jr.

Parthasarathi discloses the above outlined features except for wherein said adhesive layer is a double-sided tape. However, Joiner discloses drop-in heat sink package with window frame flag with **(15)** wherein said adhesive layer is a double-sided tape (note column 4 lines 61-62). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to combine the above teachings to manufacture a semiconductor device to exceed its performance.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Parthasarathi

Parthasarathi disclose the above outlined features except for wherein the plate is formed of metal, and the metal plate has a thickness that is at least two times a thickness of said leads. However, as shown in Figure 1, it suggests the thickness of metal plate is at least two times a thickness of said leads. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to specific the thickness.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Jeng et al., Parthasarathi, Jeng et al., Joiner, Jr, and Tao et al. disclose heat sink bonded to a die paddle having at least one aperture. However, Masaki and Asano et al., whose disclose semiconductor device and heat sink used therein, could also be used for this office. They will be used in the next office action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chuong A Luu whose telephone number is (703)305-0129. The examiner can normally be reached on M-F (7:30-4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on (703)308-1323. The fax phone numbers for the organization where this application or proceeding is assigned are (703)308-7722 for regular communications and (703)308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

Chuong Anh Luu
Assistant Examiner

CAL
May 7, 2001



MATTHEW SMITH
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TECHNOLOGY CENTER 2800